Accelerator Systems Division Highlights Ending April 29, 2005

Installation

Craft Snapshot 4/26/05

ASD productive craft workers	**54.0**
Foremen (Pd by 15% OH)	7.0
AMSI management (Pd directly)	3.0
TOTAL AMSI WORKERS	64.0
Less WBS 1.9, 1.2 etc	**8.0**
Less absent	**2.0**
TOTAL PD BY ASD/ORNL DB WPs	**44.0**

Accelerator Physics

- A collaboration of SNS RF, Diagnostics and Accelerator Physics personnel, together with collaborators from LANL, IU and LBL, constructed and commissioned a transverse feedback system at the Los Alamos Proton Storage Ring to explore active damping of the electron-proton instability. The system consists of a stripline BPM pickup, a low-level analog circuit to provide feedback drive signals, an optical delay unit to achieve the required betatron phase advance between pickup and kicker, and two 200 W 200 MHz power amplifiers. The team had 20 hours of beamtime at the PSR The test was successful, and damping of an e-p instability was achieved. The bandwidth for excitation was 100-180 MHz, and complete damping of the instability was observed
- The beam optics to the linac dump are being designed for different beam energies, for use during SCL commissioning.
- A study is underway to evaluate SCL cavity fault tolerance and rematching requirements using two different codes, PARMILA and IMPACT. The two codes give different longitudinal emittance growth, but similar transverse emittance growth.
- The group is preparing papers for the upcoming Particle Accelerator Conference

Operations

Ion Source

- A new, compact e-target has been installed on the extractor of the ion source hot spare stand. This has reduced the LEBT HV problems.
- RF emission from the Ion Source Hot Spare Stand has been reduced by a factor ~3 as a result of shielding implemented the previous week.
- The Front-End Ion Source receptor flange has been equipped with 4 fiducials pinned into the side of the flange. This will allow our alignment group to determine the absolute ion source position and tilt angle. The previously glued-on fiducials did not withstand the occasional impacts during ion source changes.

Survey and Alignment

Mechanical

Ring Systems Installation

- The Injection SS dump septum magnet stand was aligned and grouted.
- The Injection SS chicane magnet chambers (3) were received and staged.
- The Injection SS magnets alignment was started.
- The Primary Collimator permanent shielding was received and staged.
- The Primary Collimator scraper assembly was received and staged.
- The Extraction SS magnet support stands (5) were grouted.
- The Extraction SS BIG diagnostic was assembled.
- The RF SS beamline vacuum installation was completed.
- The RTBT Doublet Assy QV01-QH02 was grouted.
- The RTBT 21Q40 QV03 stand was grouted.

Water Systems Installation

- Installation of the Linac SCL Cryo Warm Section cooling connections continued.
- Installation of the Ring arc magnet cooling connections was completed and flushing is in process.
- Installation of the Ring SS doublets cooling connections was completed.
- Installation of the Ring Injection SS kicker magnets cooling connections was started.
- Fabrication of the RTBT Collimator Closed loop system continued.

All Warm Sections have been installed. MB02 and MB02 are removed for Cryomodule repair.
We have mapped eight 21Q40's. Seven of these have been chosen for installation. We have switched to mapping 27CD30's. As of today, two of those are mapped. We have started assembly of RTBT QH10 which consists of a 21Q40 and beam pipe with associated BPM.

Electrical Group

- Modulator SCL ME-21 (formerly SCL ME-7) installation, testing and commissioning is complete. This completes the installation and commissioning of all of the Linac Modulators.
- Completed integrated magnet/power supply/controls testing for SCL warm sections 19, 20 and 22, bringing the completed warm section integrated magnet/power supply/controls tests to 30 of 34.
- RTBT heavy magnet cabling complete – started corrector and Klixon cabling along with rack and ac power installation.
- In the Ring, started Extraction kicker cabling. Controls wiring, ac power wiring, and magnet terminations in progress.

HPRF

Ring RF System

- AC power connections are complete for 3 of the 4 Final Amplifiers in the Ring Tunnel.
- AC power installation is now about 95 % complete.
- Cavities beam pipes are now connected together and each end of the set is connected to the external pipes. Ready for final alignment and placement of the final amplifiers.

LLRF

Cryo Group

- CM1 cooled down successfully
- Getting ready to cool down CM21 and maybe CM22 next week
- Moved out of the tunnel 2 leaking CM's
- Started working on repairing CM2

Controls

A large contingent of Controls Group members attended the EPICS Collaboration Meeting at SLAC in Palo Alto, California. Many SNS presentations were made – notably on the new EPICS Archive Viewer and on the ongoing database collaboration (IRMIS) with APS and others. SNS may host the next EPICS Meeting.

In work associated with the IRMIS database collaboration, ,this week we successfully "crawled" our current IOCs with a new module that parses each IOC's command file to get a list of modules that the IOC is running, and parses boot information to get epics version, VxWorks version...etc.

Vacuum system procedures for cryomodules HB 7- 9 are complete, allowing RF processing of these cavities to begin. MB1 vacuum equipment has been connected to the controls rack, allowing monitoring and control through EPICS.

The last two RF systems were added to the Linac PPS including SCL-ME18, SCL-ME21, SCLRF-18, SCLRF-20, SCLRF-21, and SCL-RF22. All RF system in the Linac have now been certified with the PPS. All PPS cabling in the Klystron gallery has been completed with the exception of one magnet power supply. Linac PLC programs have been upgraded to RSLogix version 13 offline. Integration testing is in progress in preparation for recertification on May 20.

The installation of all signal wiring for the cryogenic control system was completed. The last cryogenic control system PLC (16 total) and IOC (11 total) were installed in the klystron building. Both are functioning properly. Checkout of the cryogenic controls for cryomodules 21, 22, and 23 was started.

Installation of connectors for the last cryomodule: the end of a long trip down the SCL.

In a flurry of activity as we approach the end of Davis-Bacon construction activities, ten SROs were submitted for Ring cabling, and ten more for the PPS system. The last known ICS communications cable SROs were also submitted to the Installation Group. These covered special installation requirements for the Timing Master racks in the Ring Service Building.

Ring Vacuum PLC documentation for terminations is complete and drawings are in the final stages of being released. This documentation forms a part of the Ring SROs mentioned above. The RTBT documentation conversion will start next week. The HEBT vacuum wire list and drawing have been updated. All vendor-built cables e.g. gauge and ion pump controller to PLC are on hand and rack termination will begin next week.

Beam Diagnostics

BPM:

- LANL engineers are helping us with BPM calibration software improvements. All LINAC systems are in place awating new software.
- Changes to electronics needs documentation, support for RF Distribution system on going and waiting for delivery of parts.
- BPM heliax cables are terminated fo the entire Linac except for HEBT BPM 10 and 11. These two BPMs will be completed when the HEBT beam pipe is installed. The SCL cables are being routed to the warm sections and Dan will be working on the remaining phase matching when he finishes build up of the BIG. The BPM PCs are installed and have a current image.

BCM:

- Igor is programming the AlazarTech cards so we can replace the acqiris cards and return those to their owners
- Differential electronics are slated for design and test to mitigate noise abatement
- We have not installed the BCM PCs yet

BLM:

- Low noise amplifier, and HV power supply are built and being tested , code written for safety interlocks.
- LM and Neutron Detector cable termination is in progress in the tunnel. We are waiting on the DB crew to install the Neutron Detector stands for the dummy CMs. The rack terminations are complete and the equipment can be installed by Andrei at any time.

Laser:

- Quad Sensor boards are in and mechanical mounts are being built, Assembly of boards started
- Syd has built up the PCs for the laser wire systems, we are missing a few cards and some of the fan power supplies but all are on order. All of the cables are terminated in the racks and the tunnel. The three junction boxes in the downstream end of the SCL will have cable tray mounted next week then we will hang the boxes and they can be terminated. Syd is going to begin build up of one LWE (controls the flipper, beam line quads, photo diodes, and Electron Collector) spare chassis and two LTLCh (controls the transport line actuator and quad) chassis required for software development and trouble shooting.

D-Box:

- Emittance electronics are in final design incorporating, -100V Bias, Differential transmitter and receiver and adjustable gain controls. PCB design is underway. Delivery by May

Video:

- Igor has modified both CCU chassis (camera control unit) we need to build one more chassis for use in the HEBT control room but this chassis is built by us not the lab.

Timing/Reference:

- 340+ ETS Timing cards are delivered, programmed and tested, approx 27 need rework, bad IC loose connectors etc.
- RF Reference fiber is complete to the end of SCL and is waiting testing by Jim P. and Craig. The fiber in the HEBT is nearing completion. We have enough Distribution Electronics chassis for the Linac run at this time. We need for the RF techs to come behind us and install the fiber to RF converters for the 10MHz outputs.

Installation:

- Both Dan and Jim D. have been working on the BIG. Dan will go back to finishing the phase matching.
- Software Integration:
- Work in progress on template version 2: writing documents
- SQL being integrated with data-logger

Configuration:

- Ch0: created binary EPICS distribution, tested different large screen LCD TV: much better at higher resolution

General:

- Cary finished X-ray acquisition system for tests in the tunnel
- EPICS Meeting (Purcell and Liyu)
- The cubes and work benches have arrived in the labs. We are trying to find out if we set them up or if the mfg. will. When set up is complete we will begin to move immediately. Andy will schedule help with John Kristy to move the heavy equipment.